

## **Chapter 4**

### **Public Response to Hurricane Floyd In Northeast Florida**

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#### **Survey Method**

Approximately 600 telephone interviews were conducted in the seven counties of the Northeast Florida Regional Planning Council (Nassau, Duval, St. Johns, Flagler, Clay, Putnam, and Baker). The sample was stratified as follows:

1. 200 interviews in areas at risk to storm surge in category 1 hurricanes
2. 200 interviews in areas at risk to storm surge in stronger hurricanes
3. 100 interviews in areas of coastal counties not subject to inundation by storm surge
4. 100 interviews in non-coastal counties.

Evacuation zones defined in the most recent hurricane evacuation study for the region were used to identify the sampling areas. In Flagler the category 1 and 2 evacuation zones are the same. A copy of the questionnaire is included as Appendix I.

#### **Statistical Reliability**

Figures reported from surveys cited in this report are based upon samples taken from larger populations. The sample values provide estimates of the values of the larger populations from which the samples were selected, but usually are not precisely the same as the true population values. In general, the larger the number of people in the sample, the closer the sample value will be to the true population value. A sample of 200 will provide estimates which one can be 90% "confident" are within 4 to 6 percentage points of the true populations values, whereas a sample of 100 will provide the same degree of confidence of being within 5 to 8 percentage points of the true population values. With a sample of 50, one can be 90% "confident" of being within 7 to 11 percentage points of the actual population value, and a sample of 25 is 90% "accurate" only within 10 to 17

percentage points. With a sample of 50, one can be 90% "confident" of being within 7 to 12 percentage points of the actual population value. A sample of 25 is 90% "accurate" only within 10 to 17 percentage points.

The ranges (e.g., "10 to 17") stem from the fact that the reliability of an estimate depends not only on the size of the sample but also upon how much agreement there is among the responses. Having 90% of the respondents give a particular answer means almost everyone agreed. By the same reasoning, if only 10% gave a particular response, almost everyone agreed (i.e., 90% disagreed with the 10% but agreed with one another). The maximum disagreement is for the responses to be split 50-50. Thus, if 90% (or 10%) of a sample of 100 give a particular response, that estimate will be within 5 percentage points of the true population value 90% of the time. If 75% (or 25%) of a sample of 100 give a particular response, that estimate will be within 7 percentage points 90% of the time. If 50% of a sample of 100 give a particular response, that estimate will be within 8 percentage points 90% of the time.

Therefore, readers should keep in mind that some estimates provided in this report are more statistically reliable than others. This is particularly noteworthy in drawing conclusions about whether two survey results are "different" from one another. Differences of a few percentage points in sample results of 100 or less do not necessarily mean the populations from which the samples were drawn are different. When the aggregate samples are broken down into subgroups, the reliability of estimates for the subgroups suffers. Tables contain actual sample sizes used to calculate the values reported in the table. Sample sizes vary from table to table because not all questions were asked of all respondents (people who didn't evacuate weren't asked where they went, for example), some respondents refused to answer some questions, and in a few cases responses were invalid.

### Evacuation Participation Rates

Evacuation, as used in the survey, refers to leaving one's home to go someplace safer. In the category 1 risk zone, 80% evacuated (Table 1). Emergency management officials in the largest county, Duval, ordered evacuation for the area east of the intracoastal waterway, which did not include category 1 risk areas along the St. Johns river in our sample. That might have accounted for part of the reason the participation rate was no higher. The "shadow" evacuation in other risk areas (i.e., evacuation from areas not told by officials to evacuate) was substantial, no doubt accounting for much of the evacuating traffic.

Table 1. Percent who left their homes in Floyd, by risk zone

	Cat 1 Surge Zone N=203	Other Surge Zones N=201	Coastal Non-surge N=100	Non-Coastal Counties N=103
Evacuated	80	44	30	24

Most of the residents who did not evacuate gave the same reason: they felt their home would be safe, given the likely track and strength of the storm (Table 2). Some apparently observed the heavy traffic and decided not to leave. Some said they attempted to evacuate but gave up because of the traffic.

Table 2. Why Stayed (Percent of Respondents)

	Cat 1 Surge Zone N=41	Other Surge Zones N=103	Coastal County Non-Surge N=69	Non-coastal Counties N=77
House OK for Storm	51	55	59	58
Officials Said Stay	7	4	2	3
Media Said Stay		3		1
Friends Said Stay		4	5	
Officials Didn't Say Leave	7	9	7	7
Probabilities Low	2	14	15	22

Table 2. Why Stayed (Percent of Respondents) continued

Other Info. Would Miss	5	14		11
No Place to Go	5	2	3	1
Protect from Looters	5		2	1
Protect from Storm	2	4	2	3
Left in Past Miss	7	6	3	
Job		6	7	3
Waited Too Long		1	2	
Traffic	20	13	14	13
Tried, Gave Up	12	4	3	1
Dangerous on Road	7	2	2	
Pets	7	6	2	1
Required Medical Care		1	3	1
Other	7	15	10	4
Don't Know	5	6		3

Respondents were asked specifically whether anyone in their household had to work during Floyd and how that affected their evacuation (Tables 3, 4). At least a fourth said someone in the household had to work, and some said it either prevented some in the household from evacuating or delayed their departure.

Table 3. Someone in Household Had to Work in Floyd

	Cat 1 Surge Zone N=203	Other Surge Zones N=201	Coastal County Non-surge N=100	Non-coastal Counties N=105
Yes	26	23	28	35
No	74	77	72	65

Table 4. How Work Affected Evacuation in Floyd

	Cat 1 Surge Zone N=53	Other Surge Zones N=43	Coastal County Non-surge N=28	Non-coastal Counties N=37
None	40	54	65	60
Kept All from Leaving	4	5	8	27
Kept Part from Leaving	13	12	9	3
Delayed All in Leaving	32	19	17	5
Delayed Part in Leaving	6	2		5
Other	6	7		

Those who didn't evacuate were asked whether they would have left had they been convinced the storm was going to strike, and most said they would have (Table 5). Most also said they had made the necessary preparations to leave in case conditions worsened (Table 6).

Table 5. Stayers Who Say They Would Have Left If Convinced Storm Was Going to Hit

	Cat 1 Surge Zone N=41	Other Surge Zones N=111	Coastal County Non-surge N=69	Non-coastal Counties N=84
Would Have Left	76	60	61	67
Wouldn't Have Left	12	26	32	20
Don't Know	10	13	7	1
Other	2	1		11

Table 6. Stayers Who Say They Had Made Necessary Preparations to Leave

	Cat 1 Surge Zone N=41	Other Surge Zones N=111	Coastal County Non-surge N=69	Non-coastal Counties N=83
Had Prepared	83	65	64	71
Hadn't Prepared	17	34	32	28
Don't Know			3	1

Evacuees were asked what convinced them to leave, and most indicated some combination of response to actions by public officials and concern about storm conditions (Table 7.)

Table 7. Why Left (Percent of Respondents)

	Cat 1 Surge Zone N=163	Other Surge Zones N=87	Coastal County Non-surge N=28	Non-coastal Counties N=26
Officials Said Leave	41	31	13	19
NWS Said Leave	20	27	4	4
Police/Fire Said Leave	16	6	4	8
Media Said Leave	14	20	13	23
Friend Said Leave	7	15	17	4
Storm Severe	34	32	39	54
Heard “Bad as Hugo/Andrew”	3	4		8
Increased in Strength	1	2		
Concerned about Flooding	8	11	9	12
Concerned about Winds	9	16	22	50
Concerned re. Road Flooding	1	5		4
Probability of Hit	14	15	4	19
Post-Storm Concerns	1	1	9	4
Other	12	16	9	19
Don’t Know	1	1		

In an attempt to separate the effect of messages disseminated by government officials via the media from the effect of other information heard via the media, respondents were asked which had the greater impact on their decision to evacuate. Information from officials had the greater impact, according to respondents (Table 8).

Table 8. Greatest Influence to Leave (Percent of Respondents)

	Cat 1 Surge Zone N=164	Other Surge Zones N=84	Coastal County Non-surge N=26	Non-coastal Counties N=24
Gov't Officials Info via Media	58	49	33	63
Other Media Info	33	33	14	21
Info from Friends	14	17	38	4
Other	11	11	24	21
Don't Know	1			

Interviewees were also asked whether they heard from officials – either directly or indirectly – that they should evacuate. Only in the category 1 risk area did a majority say they did (Table 9). Those who did hear evacuation notices were more likely than others to evacuate (Table 10). In the category 1 risk area, 97% of those who said they heard mandatory evacuation orders evacuated.

Table 9. Heard Evacuation Notices from Officials

	Cat 1 Surge Zone N=205	Other Surge Zones N=201	Coastal County Non-Surge N=100	Non-coastal Counties N=107
Heard Notice	68	41	25	16
Didn't Hear	31	57	72	82
Don't Know	2	2	3	3

Table 10. Evacuation Participation Rates, by Hearing Evacuation Notices from Officials  
(Sample size varies by cell)

	Cat 1 Surge Zone	Other Surge Zones	Coastal County Non-Surge	Non-coastal Counties
Heard Must	97	84	60	67
Heard Should	69	50	61	64
Didn't Hear	59	27	16	14

A majority of people living in all four risk areas believe they would be unsafe in a 125 MPH hurricane in their own homes (Table 11a). In all four risk zones people who perceived their homes to be vulnerable were more likely than others to evacuate (Table 11b).

Table 11a. Perceived Safety of Home from Wind and Water in 125 MPH Hurricane

	Cat 1 Surge Zone N=203	Other Surge Zones N=201	Coastal County Non-Surge N=100	Non-coastal Counties N=103
Safe	18	25	40	27
Unsafe	76	60	50	57
Don't Know	6	15	10	16

Table 11b. Evacuation Participation Rates, by Perceived Safety in 125 MHP Storm (See previous table for sample sizes for each cell)

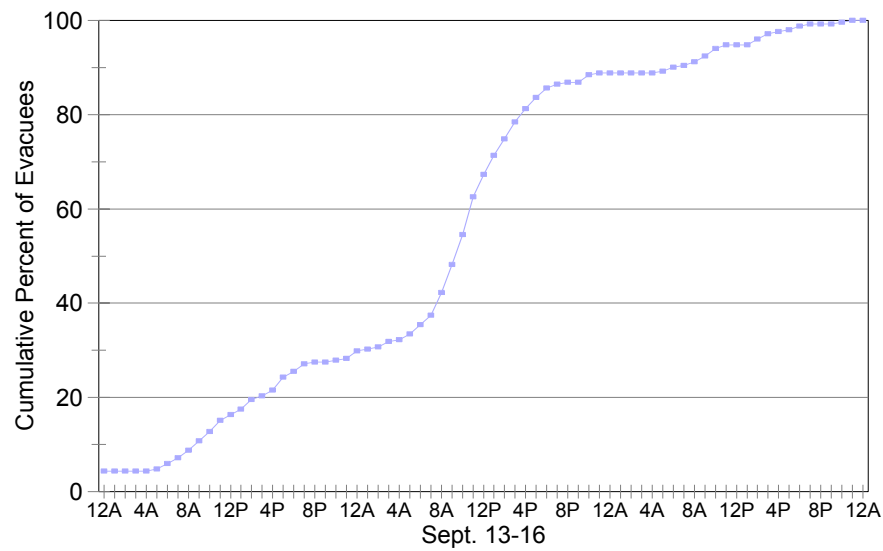
	Cat 1 Surge Zone	Other Surge Zones	Coastal County Non-Surge	Non-coastal Counties
Safe	72	26	15	10
Unsafe	84	58	44	37
Don't Know	54	23	10	0



### Evacuation Timing

Evacuation departures were fairly gradual, primarily during September 13 and 14, with the steepest portion of the response on the 14<sup>th</sup>. Forty percent of the eventual evacuees had left by 8 AM on the 14<sup>th</sup>. A hurricane watch was issued for the area at 11 AM on the 13<sup>th</sup>, followed by a warning at 5 PM later that day.

## Cumulative Evacuation Northeast Florida Region



### Use of Public Shelters and Other Refuges

The great majority of evacuees went to the homes of friends and relatives or to hotels and motels (Table 12). Only in the non-category 1 surge zone did more than five percent of those interviewed say they went to public shelters.

Table 12. Types of refuge used (percent of evacuees)

	Cat 1 Surge Zone N=163	Other Surge Zones N=89	Coastal County Non-Surge N=24	Non-coastal Counties N=25
Public Shelter	4	9	4	4
Church	1	3	0	4
Friend/Relative	51	47	63	52
Hotel/Motel	32	30	25	24
Workplace	3	2	0	0
Other	10	8	4	16

### Evacuation Destinations and Transportation Issues

Most evacuees left their own county, going elsewhere in Florida, with a third going into Georgia (Tables 13, 14). The roughly 75% out-of-county evacuation was slightly higher than normal for the region.

Table 13. Percent of evacuees by destination, by risk zone

	Cat 1 Surge Zone	Other Surge Zones	Coast Non- Surge	Non-Coastal Counties
Own Neighborhood	5	13	11	31
Own County	20	9	15	15
Out of County	75	78	74	54

Table 14. Percent of out-of-county evacuees, by state destination

Florida	55
Georgia	32
South Carolina	1
North Carolina	4
Virginia	
Alabama	7
Tennessee	<1
Other	<1

Going out of county (beyond the surge inundation limits) was motivated by three main factors: the strength of the storm, the location of friends and family, and the lack of closer motels (Table 15). Information from government officials conveyed by the media was a larger influence than other media information (Table 16).

Table 15. Why Went Out of County (percent of evacuees)

	Cat 1 Surge Zone N=121	Other Surge Zone N=66	Coastal County Non-surge N=18	Non-coastal Counties N=14
Strength of Storm	58	35	28	29
Previous Hurricane Experience	3	15	11	14
Comparisons to Hugo/Andrew	2	3	6	7
Officials Said Leave County	4	6		
Media Said Leave County	1	5		
Friend Said Leave County	8	11	6	
Friend Lives in Destination	34	35	44	43
No Public Shelter Closer	10	6		
No Motels Closer	36	26	17	43
Other	16	12	22	14
Don't Know	1	2		14

Table 16. Greatest Influence for Going Out of County

	Cat 1 Surge Zone N=122	Other Surge Zones N=65	Coastal County Non-surge N=18	Non-coastal Counties N=14
Media Info from Gov't Officials	51	46	39	71
Other Media Info	23	23	17	21
Info from Friends	22	15	39	7
Other	14	19	17	14
Don't Know	3	2		

At least 75% of the evacuees from most risk areas eventually reached their destinations (Table 17). Of those who changed destinations, about half went someplace closer than anticipated and half when farther (Table 18). Traffic was the main reason for changing destinations (Table 19).

Table 17. Whether Reached Original Destination (percent)

	Cat 1 Surge Zone N=163	Other Surge Zones N=84	Coastal County Non-surge N=24	Non-coastal Counties N=27
Yes	78	80	79	56
No	20	19	17	41
Don't Know	2	1	4	4

Table 18. Proximity of New Destination, Compared to Original Destination (percent)

	Cat 1 Surge Zone N=33	Other Surge Zones N=16	Coastal County Non-surge N=4	Non-coastal Counties N=11
Farther	52	56	50	46
Closer	46	25	50	54
Same	3	13		
Don't Know		6		

Table 19. Why Changed Destination (percent)

	Cat 1 Surge Zone N=32	Other Surge Zones N=17	Coastal County Non-surge N=4	Non-coastal Counties N=9
Traffic	47	29	50	67
Loc. of Refuge	31	50	25	56
Out of Gas	6	7		
Tired	16	14		11
Bathroom	3			
Storm Close	3	14	25	
Other	34		25	33
Don't Know				22

Most people said they did not hear about traffic problems on evacuation routes before leaving home (Table 20). Of those who heard about such problems before leaving home, most did not change their evacuation route plans (Table 21).

Table 20. Heard About Evacuation Route Problems Before Leaving Home (percent)

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=27
Yes	34	33	58	44
No	64	64	42	52
Don't Know	2	4		4

Table 21. Changed Routes Because of Information Heard Before Leaving Home

	Cat 1 Surge Zone N=56	Other Surge Zones N=28	Coastal County Non-surge N=14	Non-coastal Counties N=12
Yes	45	39	21	17
No	55	61	79	83
Don't Know				

Those who said they had heard about evacuation problems before leaving home were also asked whether they heard about such problems after leaving home. Two-thirds said they did (Table 22). About a third of those changed their route plans accordingly (Table 23).

Table 22. Heard About Evacuation Route Problems After Leaving Home

	Cat 1 Surge Zone N=56	Other Surge Zone N=28	Coastal County Non-surge N=14	Non-coastal Counties N=12
Yes	63	68	64	67
No	36	32	36	33
Don't Know	2			

Table 23. Changed Routes Because of Information Heard After Leaving Home

	Cat 1 Surge Zone N=35	Other Surge Zones N=19	Coastal County Non-surge N=9	Non-coastal Counties N=8
Yes	37	32	33	25
No	63	68	67	75
Don't Know				

Most evacuees used interstate highways for at least part of their evacuation (Table 24). Those who used interstates in Floyd gave a mixture of future intentions concerning road use, but the overall tendency appeared to be flexibility, depending upon the circumstances (Table 25). More than 75% of the respondents said they were familiar with the roads in the area through which they evacuated (Table 26). Three-fourths also said they would be willing to use a different route than they would normally use if government officials urged them to do so to avoid congestion, even if the route took them

out of their way (Table 27). Only about 10% said they would be unwilling to comply with that sort of request by officials.

Table 24. Used Interstate for at Least Part of Route

	Cat 1 Surge Zone N=163	Other Surge Zones N=84	Coastal County Non-surge N=24	Non-coastal Counties N=26
Yes	52	45	67	46
No	45	54	33	54
Don't Know	3	1		

Table 25. Routes to be Used in the Future

	Cat 1 Surge Zone N=85	Other Surge Zones N=38	Coastal County Non-surge N=16	Non-coastal Counties N=12
Interstate	45	34	44	42
Secondary Roads	26	18	13	17
Both	9	21	13	8
Depends on Traffic	6	13	13	8
Depends on Other	9	8	6	17
Other	1	3		
Don't Know	2	3	13	8

Table 26. Familiar with Roads in Area

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=27
Yes	88	78	79	82
No	10	20	21	19
Don't Know	2	2		

Table 27. Would Use Routes Advised by Officials, Even if Longer

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=26
Yes	77	73	67	77
No	9	5	17	8
Depends How Much Longer	5	5	4	4
Depends on Other	6	14	8	8
Other	2			4
Don't Know	2	4	4	

Almost half the respondents said it took them more than five hours to reach their destination, and about 15% said it took ten or more hours (Table 28). Only 20% to 30% expected the evacuation to take more than five hours, and fewer than five percent expected it to take ten or more (Table 29). When asked how long it was reasonable for an evacuation like Floyd's to take, most respondents gave times shorter than the actual evacuation but slightly longer than their original expectation (Table 30).

Table 28. Hours Required to Reach Destination

	Cat 1 Surge Zone N=157	Other Surge Zones N=81	Coastal County Non-surge N=24	Non-coastal Counties N=24
Less than 2	38	25	25	38
2 to 5	21	36	25	34
5 to 10	29	23	38	21
10 or more	13	16	12	8
Mean No. Hrs	4.6	4.8	5.4	3.9
Median No. Hrs	3.0	3.0	4.8	2.5



Table 29. Hours Expected to Reach Destination

	Cat 1 Surge Zone N=147	Other Surge Zones N=81	Coastal County Non-surge N=24	Non-coastal Counties N=24
Less than 2	45	41	26	44
2 to 5	35	46	44	30
5 to 10	19	10	30	26
10 or more	1	3	0	0
Mean No. Hrs	3.0	2.7	3.6	2.7
Median No. Hrs	2.0	2.5	3.0	2.0

Table 30. Hours Reasonable to Reach Destination

	Cat 1 Surge Zone N=140	Other Surge Zones N=81	Coastal County Non-surge N=24	Non-coastal Counties N=24
Less than 2	44	29	30	55
2 to 5	27	42	35	20
5 to 10	28	26	30	25
10 or more	1	3	5	0
Mean No. Hrs	3.2	3.3	4.0	3.0
Median No. Hrs	2.0	3.0	4.0	1.25

Most people thought the traffic delays were caused mainly by the sheer volume of traffic and the fact that too many people left at once (Table 31). Many also cited poor traffic management and advocated reversing lane directions. Most respondents said they would be willing to cooperate in a phased evacuation in which they would delay their departure for a few hours until people in a more dangerous location had begun their evacuation (Table 32).

Table 31. Why Traffic Was Slow

	Cat 1 Surge Zone N=163	Other Surge Zones N=83	Coastal County Non-surge N=24	Non-coastal Counties N=27
Number of Cars	40	54	42	67
All Left at Once	40	57	33	37
Waited too Long	9	13	13	19
Construction	1	4	4	4
Accidents	1	1	4	4
Poor Traffic Management	27	35	13	19
Need Reverse Lanes	17	13	25	19
Bad Weather	2	2		7
Other	18	11	17	33
Don't Know	20	6	8	4

Table 32. Would Delay Departure if Urged by Officials

	Cat 1 Surge Zone N=204	Other Surge Zones N=201	Coastal County Non-surge N=011	Non-coastal Counties N=105
Yes	78	74	75	83
Depends on Storm's Proximity	5	7	2	6
Depends on Storm's Strength	1	4	1	
Other	2	1	2	1
Don't Know	6	8	5	7
No	8	8	14	4

Most evacuees did not cite specific difficulties experienced during the evacuation. Needing restroom facilities was most common, but a few ran out of gas or had mechanical breakdowns (Table 33). More than 35% of the evacuees said they heard about places where they could find shelter if they weren't able to reach their destinations (Table 34). Few changed their plans about seeking shelter as a result (Table 35). Most interviewees reported no difficulties returning from the evacuation (Table 36).

Table 33. Difficulties Experienced in Evacuation

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=26
Ran Out of Gas	2	1		
Car Broke Down	3	2		
Needed Water	1	2		4
Needed Food	4	4		4
Needed Restroom	7	11		4
Other Difficulties	1			
No Difficulties	87	85	100	96

Table 34. Heard About Refuge Options After Leaving Home

	Cat 1 Surge Zone N=162	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=26
Yes	39	35	33	62
No	59	64	63	39
Don't Know	2	1	4	

Table 35. Changed Plans Because of Refuge Information Heard After Leaving Home

	Cat 1 Surge Zone N=62	Other Surge Zones N=29	Coastal County Non-surge N=7	Non-coastal Counties N=16
Yes	13	3	0	6
No	87	97	100	94
Don't Know				

Table 36. Difficulties Experienced Returning from Evacuation

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=27
Lack of Information	2			
Roads Blocked	1	2		
Traffic Congested	7	2	4	11
Re-entry Not Permitted	2	2		
Other Difficulties	2	1		11
No Difficulties	87	92	96	85

Vehicle use was typical of most evacuations, in which 65% to 75% of the available vehicles are used (Table 37). Few households required assistance in evacuating, and in most instances outside agencies were not required (Table 38).

Table 37. Vehicle Use by Evacuating Households

	Cat 1 Surge Zone N=164	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=25
Percent of Available	74	66	68	70
Avg. Number Per Household	1.45	1.39	1.17	1.52
Pulled Trailer, Took Motorhome	5	3	4	0

Table 38. Required Assistance in Evacuating

	Cat 1 Surge Zone N=163	Other Surge Zones N=85	Coastal County Non-surge N=24	Non-coastal Counties N=27
Yes, Within Household	2	6		
Yes, Friend/ Relative	1	1	4	
Yes, Agency	1	1		
No	96	92	96	100

Local television was relied upon most heavily by the respondents for information about Floyd, followed by The Weather Channel (Table 39). Local radio was the third most relied-upon source of information.

Table 39. Relied On a Great Deal for Information about Floyd

	Cat 1 Surge Zone N=201	Other Surge Zones N=200	Coastal County Non-surge N=100	Non-coastal Counties N=105
Local Radio	30	28	27	24
Local Television	78	73	91	82
CNN	13	21	12	11
Weather Channel	54	53	52	44
Other Cable	5	6	7	8
Internet	5	6	4	4
AOL	3	4	2	1
Word of Mouth	10	12	11	8

Most respondents in the sample said they wouldn't do anything differently if faced with the same circumstances again as in Floyd (Table 40). Some who left wouldn't, but some who didn't leave would. Many would plan to leave earlier.

Table 40. Would Do Differently Next Time

	Cat 1 Surge Zone N=204	Other Surge Zones N=201	Coastal County Non-surge N=100	Non-coastal Counties N=105
Would Leave	8	4	7	4
Wouldn't Leave	13	11	9	4
Leave Earlier	23	16	13	12
Leave Later	3	1		
Go Farther	2	1	1	
Go Closer	3	1	1	
Use Public Shelter	1	1		
Not Use Pub Shltr				1
Different Route	6	2		
Buy Gasoline		1		
Take Provisions	2	2		2
Other	9	9	8	4
Don't Know	3	6	4	4
Nothing Different	52	65	67	77

